

**Claims**

1. A pressurized loop solar collectors system for delivering solar energy from a roof mounted panel to a domestic hot water tank.
  - a. Pressurization system capable of maintaining system pressures above atmospheric to increase the boiling point of the heat collection fluid.
  - b. A means to prevent damage to solar collectors system from overheating during abnormal conditions
  - c. The means to prevent damage from freezing in winter environments.
  - d. A means to deliver heat to the hot water tank with an easily adaptable internal heat exchanger.
  - e. A better means to deliver heat to the hot water tank even with an external heat exchanger.
2. A boiling activated collector over-temperature protection system, which utilizes no moving parts.
  - a. The boiling gas separator, which allows gas bubbles to heat a liquid to air heat exchanger.
  - b. A filler tube, which allows the gas bubbles to heat the liquid to air heat exchanger, while keeping the system fluid loop full of liquid.
3. A pressure activated collector over-temperature protection system which utilizes solar collector air dampers as moving parts.
  - a. A pressure activated mechanical actuator, which opens before the systems regulated pressure is reached.
  - b. A set to of damper the valves, which control airflow over the solar collector panel, so when opened the sun's energy is dissipated to the flowing air and when closed the sun's energy is delivered to the fluid loop and hot water tank.
4. A flexible umbilical assembly, which carries and insulates the heat transfer fluid tubing, and includes all electrical connections between the solar collector and the hot water tank.

4/8/2002

5. The system in claim 1, with a 220/115 VAC controller and pump, with boiling activated over-temperature protection of claim 2.
6. The system in claim 1, with a 220/115 VAC controller and pump, with pressure activated over-temperature protection of claim 3.
7. The system in claim 1, with a photovoltaic panel and low voltage (12VDC) pump, with boiling activated over-temperature protection of claim 2.
8. The system in claim 1, with a photovoltaic panel and low voltage (12VDC) pump, with pressure activated over-temperature protection of claim 3.

2009 RELEASE UNDER E.O. 14176